Economic Benefits of RAMP Activities

Introduction

Agriculture is Afghanistan's largest and most important economic sector. It provides employment to over 80 percent of the population and generates about half the GDP. Once a vibrant source of food and export income, Afghanistan's agriculture sector has been devastated by over 20 years of war and five years of drought. The livestock population was greatly diminished, orchards were uprooted for fuel, irrigation systems were destroyed and many Afghans were unable to feed themselves or purchase food with wages of less than US$1 a day.

USAID is meeting the challenge to rebuild the agriculture sector in Afghanistan through the Rebuilding Agricultural Markets Program (RAMP), which started in July 2003. RAMP's objectives were to increase the marketable value of agricultural products sold in local, regional and international markets by US$250 million by the end of the crop year 2006.

RAMP adopted a market-driven, value chain approach emphasizing the importance of strengthening all the processes from input supply, through production, post-harvest handling – storage, transportation and processing – and marketing to increase sales of agricultural products. RAMP has concentrated on five principal, higher return product lines; focused activities geographically in 9 provinces; integrated infrastructure rehabilitation, financial services, agricultural technology and market development components; and worked collaboratively with key ministries of the Government of Afghanistan, other donors, and the Provincial Reconstruction Teams (PRTs).

RAMP activities were selected for their predicted impact on agriculture growth. Crops were prioritized and those that could generate value-added income and drive the growth process were supported. Wheat, being the staple grain of the country, was emphasized and strategies were put in place to achieve a rapid increase in yields for food security purposes. This subsequently leads to a decline in area planted with wheat and a corresponding increase in the area planted with high-value commercial crops of fruits, vegetables and nuts.

Having undertaken a value chain analysis for perennial fruits and nuts, those commodities for which Afghanistan has a comparative advantage in the regional markets, such as grapes, were promoted. By allocating credit and undertaking market analyses of export commodities, RAMP supported the development of a private sector processing and export capability. Establishment of cold storage and marketing structures ensure product quality and competitiveness in a growing global market. RAMP is rehabilitating rural infrastructure of farm to market roads and irrigation infrastructure and constructs storage and warehouse facilities in strategic locations. RAMP also implemented a national veterinary program to assist farmers and herders in rebuilding the livestock sector, buttressed with a strategy for the development of a private system of veterinary services.

Estimated Benefits

RAMP's aggregate impact from the various interventions is estimated at US$2.1 billion over the life of the project. An estimated US$511 million was realized over the period July 2003 to June 2005. A breakdown of the two year impact value indicates that US$207 million was achieved in 2003/04 and US$304 million in 2005. ***For the latter part of 2005 the estimated impact is US$1.3 billion.*** Another US$309 million is projected to accrue in 2006. Tables 1 & 2provide a breakdown of these values by sector interventions. The infrastructure interventions generated the bulk of this benefit, 67%, with irrigation alone accounting for 66% of the total impact value. The agriculture sector (crop, fruit, nut, and vegetable production and marketing) accounted for 17%, followed by livestock with 15%.

Table 1. Realized Impact (in Million US$)

	Fresh and Dry Fruit Production Marketing	Nut Marketing	Livestock & Poultry	Food Grains	Vegetable Production and Marketing	Total
2003/04 Realized	2.9	0.0	113.0	91.6	0.0	207.5
2005 Realized	9.5	1.6	168.0	116.3	8.6	304.0
Total	12.4	1.6	281.0	207.9	8.6	511.5

Table 2. Projected Impact (in Million US$)

	Fresh and Dry Fruit Production & Marketing	Nut Marketing	Livestock & Poultry	Food Grains	Vegetable Production and Marketing	Irrigation	Roads	Micro-Credit and SMEs	Total
2005 Realised			15.0		1.32	1,281.4	15.8	3.2	1,316.72
2006 Projected	14.05	15.8	35.0	86.5	19.57	124.8	9.5	3.9	309.12
TOTAL RAMP IMPACT (M)	14.05	15.8	50.0	86.5	20.89	1,406.2	25.3	7.1	**1,625.84**
GRAND TOTAL (BILLION US$)			**2,137.34**						

Note: Benefits from micro-finance and SMEs are summed and shown in the table. The 2005 projection is for the first two years; the 2006 is for the third year. The calculated benefits from irrigation and roads are placed under 2005 projection. The benefits from irrigation stretch over a number of years, but for the sake of presentation it is assumed that they are already realized. The estimated benefit from roads and irrigation projects not calculated are placed under 2006 projection.

Some of these impact values may change as the assessment methodologies are refined and more up to date information becomes available to systematically measure the projected benefits. In spite of this, ***the aggregate RAMP impact is expected to remain above US$1.6 billion.***

Macro-Economic Implications:

The macro-economic implications of RAMP activities are significant. Afghanistan's GDP for FY 2003/04 and 2004/05 was estimated at US$4.5 billion and US$5.4 billion, respectively, exclusive of illicit crop (poppy) production, which was estimated at US$2.8 billion for 2004. Agriculture accounted for between 47 to 49% of GDP. RAMP's realized aggregate impact from the various sectoral interventions for 2003/04 2004 was US$207.5 million. This is

equivalent to 5% of the annual GDP and 10% of the agriculture GDP. ***RAMP's realized impact for 2005 accounts for 30% of the annual GDP***. This ratio is very high, because all the benefits from irrigation projects that are completed and on-going are attributed to 2005. GDP for 2006 is not available, but if the Afghan economy continues to grow at the current rate an estimated share of RAMP would be 5 to 6% of the GDP.

Another way of looking at this would be to divide the aggregate impact of US$2.1 billion into three years and estimate the proportionate share against the annual GDP. This would give RAMP a ratio of 16% for 2003/04, 13% for 2004/05 and another 13% for 2005/06. ***No doubt, therefore, RAMP's assistance has had a significant impact on economic growth.***

The sectoral activities and estimated benefits (both realized and projected) are detailed as follows:

I. Infrastructure Projects

Irrigation

Irrigation water is by far the single most important input to increase agriculture productivity. A number of irrigation structures and drainage works are completed and some still running. The irrigation "projects" may conveniently be grouped in to four categories: drains, flood control, water diversion and cross-river structures, intake/canal rehabilitation, and dams. The impact assessment covered 31 irrigation projects in 7 provinces, of which 25 were systematically analysed and reported; 6 are outstanding but a preliminary projection of the impact is also given (see Annex 2.). Of those analysed projects, 14 involved ex-post impact assessment; the remaining 11 were either on-going and/or completed lately. The ex-ante assessment for the 10 projects is, therefore, forward looking projection assuming various scenarios.

All but two of the irrigation projects involve rehabilitation aimed at restoring structures to their original design structures and in some cases to upgrade and expand the existing structures, and improve water use efficiency. The two irrigation projects, both in Nangarhar province, (Nangarhar Canal km 64 to km 70 and Flood Diversion II) were new structures designed and constructed by RAMP

These irrigation projects provide irrigation water for double, in some cases for triple, cropping in a season. Crops are also irrigated optimally providing increased productivity per unit land. ***Cumulatively, the canals and other structures provide irrigation water to 464,272 hectares of agriculture land***. ***The net incremental benefit from increased agriculture production and land reclamation activities, estimated to be about US$1.28 billion, would significantly increase food security, incomes and farm employment and provide a spur to economic growth***. Another US$128.4 million is projected to be gained from those irrigation projects that have not been analyzed yet.

Roads

Through local and international implementing partners, RAMP has rehabilitated 415km village to market roads. Another 117km road work is in progress. These gravel roads play an important role in the growth process through increasing mobility of resources and increasing factor productivity. They help the adoption of new technology by reducing the cost of inputs and marketing of outputs. They save time and decrease the cost of transportation, and, thereby, help both the rich and the poor. Rural roads strengthen linkages between towns and the countryside and foster the commercialization of agriculture. ***The estimated benefit from these roads over a three year period is in the order of US$25.3 million***, including projection for those roads that are under rehabilitation.

II. Agriculture Production and Marketing

Fruit, Nuts and Vegetables

Working closely with Afghan traders and exporters, RAMP has been aggressively promoting Afghan fruits and nuts in regional and European markets. Various kinds of marketing strategies, including an assessment of the structure and performance of the international market for fruits and nuts have been done in order to regain the ground Afghanistan has lost in the past 20 years. These efforts have started to bear fruit. Over the past 3 years, Afghan exports of fruits and nuts to regional markets – India, Pakistan, Gulf States – as well as to Europe have grown steadily. ***Total exports rose from US$2.9 million in 2003/4 to US$9.5 million in 2005.*** Continuous marketing efforts, including product quality improvement, grading and standardizing, as well as extension work by RAMP through its implementing partners are responsible for the positive developments in the market. A strong agribusiness sector is emerging in the fruit and nut sector. Traders of all sizes and specialties are working to cultivate relationships with foreign buyers. Three associations (one each in Mazar, Kabul, and Kandahar) are formed to create a vertically integrated agribusiness marketing enterprise. Work is also in progress to install shelling and sorting equipment. ***It is projected that income from the fruit and nut sector marketing activities in 2006 will be a two to three fold increase over the 2005 level.***

Vegetables account for up to a third of the value of annual agriculture production. Some of the high value vegetables like tomatoes, potatoes and onions generate substantial income per hectare compared to cereals, for example. The domestic demand for vegetables tends to rise, especially in the winter months and large quantities are being imported from neighboring countries to meet this shortfall. To address this problem, RAMP is providing improved varieties of vegetable seed to farmers and the ***aggregate net benefit from this is estimated at US$8.6 million in 2005.***

To maximize the gains from vegetable production, RAMP is also supporting agro-industry infrastructure processing firms in strategic locations of the country. This can raise farmers' income through the development of value-added activities, and agro-food based rural industrialization. Agro-processing is also labor intensive and generates higher value-added than unprocessed agriculture products. Since it is located in rural areas, it benefits the rural poor by increasing their incomes through jobs. Such increases in income will play a significant role in poverty reduction, sustainable growth and food security. One such initiative is located in Parwan Province. Here, a RAMP-supported enterprise dries, processes and packages six kinds of vegetables for domestic and export markets. ***The estimated net gain from this value added work over a two year period is US$2 million.***
.

Greenhouse vegetable production has also been promoted by RAMP. Over 200 greenhouses were established, each producing on average of US$800 worth of vegetables twice a year. Over a two year period, the value added from vegetable greenhouse production is estimated at US$0.64 million.

Fruits and vegetables are high value products but easily perishable unless stored properly. In order to increase their shelf life and increase producers and traders income but also meet the domestic demand for such products in the winter season, RAMP has installed 12 cold rooms in strategic locations in the country. Another 30 cold rooms are in the process of being installed. In addition, 3 refrigerated containers of 20ft capacity have been installed, and a further 12 are planned for this year. Used to full capacity, the cold stores will generate substantial income to producers and traders.

Food Crops
RAMP is assisting farmers to adopt improved technologies to increase wheat productivity. Various strategies are in place to achieve technological transformation in wheat production. One is promoting improved wheat seed varieties through demonstration farms and village based seed enterprises where "progressive" farmers grow improved seed varieties for local sale. Another strategy is to improve access for chemical fertilizers. This latter strategy is pursued by developing linkages for agriculture input dealers with agriculture input suppliers and financial institutions combined with training. To achieve this, RAMP made available $4.1 million to input dealers through the International Fertilizer Development Center (IFDC) to procure chemical fertilizers, mainly urea and DAP, for retail sale to farmers in the country. Through these instutions, fertlizer distribution and use has increased substantially. Assuming much of the fertilizer is used on wheat, ***the net incremental gain from increased use of fertilizer, valued at current prices, was US$5.6 million in 2003/4 and US$8.3million in 2005.*** IFDC has also trained over 2,000 input dealers and established 6 regional and one national dealer associations.

Another strategy aims at eradicating locust and Sunn pest as these pests account for reduced wheat yields and loss of income in many parts of the country. Implemented by FAO, the locust and Sunn pest campaign has succeeded in containing the spread of these pests and, in critical locations, the program has fully eradicated them with significant gains to the communities involved. ***The value of agricultural production (wheat) saved from the Sun pest and locust campaign in 2004 and 2005 was estimated at US$170 million*** (US$158 million from locust, and US$12 million from Snn pest). This is based solely on a 2004 analysis, and is subject to future revision.

Responding to a request by the Governor of Nangarhar Province for assistance to encourage farmers to cultivate licit crops in lieu of illicit crops (opium poppy), USAID launched an emergency wheat seed and fertilizer distribution campaign in December 2004. The program distributed 500 tons of improved wheat seed and 1,400 tons of fertilizer and provided extension advice on wheat production to farmers. This program increased the productivity of wheat from 4,000 ha and improved the food security situation for the local population. ***The net gain from increased wheat productivity was estimated at US$2 million.***

Livestock and Poultry
Implemented by the Dutch Committee for Afghanistan (DCA) in 31 provinces, more than 19 million vaccinations and treatments were given to domestic animals, equines, camels and poultry. ***The net gain from the veterinary program (livestock and poultry) from January 2004 up to September 2005 is US$281 million,*** of which US$113 million was realized up to December 2004; US$70 million was productivity gain in 2005 from animals covered in year one; US$79 million from animals vaccinated and treated between January and June 2005; and a further US$17 million was gained between July and August 2005. Much of this gain is due to a reduction in mortality and improved animal productivity.

Interventions in the livestock sector also include rebuilding the capacity of the Ministry's veterinary program to deliver animal health services. RAMP ***has established 343 veterinary field units***, three veterinary training centers (Mazar, Charikhar, Hirat), and 8 regional veterinary offices. The DCA has also established 6 cold storage facilities for proper storage of vaccinations, and trained 234 paravets and 136 basic veterinary workers.

Interventions in the poultry sector are implemented by the FAO. To date, the ***FAO has distributed over 200,000 pullets to 21,000 families*** who were also trained in various techniques of poultry management. The FAO has also ***established 800 poultry producer groups*** and vaccinated over one million chickens.

III. Rural Finance

Institutional credit in Afghanistan has yet to evolve. Small businesses and micro-credit initiatives are constrained by lack of working capital and exorbitant interest rates demanded by lenders from the informal sector. RAMP provided a $5 million grant to the Microfinance Investment Facility for Afghanistan (MISFA), which lent over $4 million in the form of capital financing for agricultural lending and granted nearly $1 million for technical assistance in the development of agricultural lending products to eight different Micro Finance Institutions (MFIs). These RAMP-funded MFIs made an estimated 89,433 agricultural loans as of August 31, 2005, though the MFIs have achieved these numbers through a combination of RAMP and other donor funding. 82% of these MFI's borrowers are women, and while the MFIs do not track gender by business sector, given the high number of livestock loans to women, it is likely that this percentage represents lending to women in the agricultural sector as well. An initial study by one RAMP-funded MFI, Aga Khan's Afghanistan Rural Micro-credit Programme (ARMP), indicates that for every $100 lent, 0.2 jobs are created (ARMP disburses $700 loans, implying that for every ARMP loan, 1.4 jobs are created).

Small-medium enterprises (SMEs) were supported with the Afghanistan Finance Company (AFC) receiving $3.5 million and the Afghanistan International Bank (AIB) receiving $2 million in funding from RAMP. As of November 30, 2005, both have disbursed over $2.4 million in agricultural loans and leases.

RAMP also funded a venture capital firm, the Afghanistan Renewal Fund, with an input of $2 million. The Fund is expected to be actively investing during the 1st quarter of 2006, and while its target is a 12.18% IRR over a three-year period, which would result in an NPV of $3,206,935, no investments have been made to date and there are no similar venture capital firms operating in Afghanistan for comparative purposes, therefore, it is impossible to state with any degree of accuracy what the real NPV will be.

Benefits from the micro-finance activities are estimated at US$3.9 million over a three year period. The benefit from AFC and AIB loans will be, respectively, US$1.6 million and US$0.9 million over three years. The projected benefit from the venture capital fund for three years is US$4.6 million.

Methodologies for Estimating Impact:

Various methodologies were employed to measure primary/direct economic benefits that can be attributed RAMP's interventions. These are classified under three major categories:

I. Infrastructure

For rehabilitated infrastructure projects (roads and irrigation systems), impact is measured as the difference between "with" and "without" rehabilitation i.e. the net incremental benefit produced by the rehabilitation works. The with net benefits are "additional" to and over the net benefits likely to be achieved after the projects with the additional yield enhancing technologies, areas shifts and crop intensification taken into account. For new structures, like the irrigation project in Nangarhar Province, RAMP is claiming full benefit.

Multiplier effects and broader development impacts of infrastructure projects (like more secure farm employment opportunities, marketing and other services, rural industries based on agro-processing, etc) are not captured by this assessment. Other secondary benefits like micro-hydro power and mills are also not included in the assessment. The primary focus of the assessment is on determining the incremental benefits in terms of increased marketable output. This is in line with RAMP's strategic objective.

Impact is measured for the life of each project independently. The technical life of the project is determined by RAMP irrigation and road engineers, having considered annual maintenance and operation requirements. Costs thus embody investment or capital costs plus maintenance costs for the appropriate years. Financial analysis was conducted on each project to judge its viability. A constant price approach was adopted, thus expressing costs and benefits in real terms. Financial Internal Rate of Return (FIRR) and Net Present Value (NPV) were computed for all projects in order to assess their viability. Benefit-cost ratios, rate of return and investment ratios (N/K ratio) were also computed. The discount rate used was 15%, which is the average cost of borrowing money from banks lending for agriculture related activities in Afghanistan. The intakes/canals may, for example, last over 30 years but their effectiveness will decline hrough time due to silting. Moreover, at the discount rate of 15% and the opportunity cost of capital in Afghanistan, any return to an investment beyond 15 years will not make much difference to the present worth of the benefits. Efficiency tests were therefore conducted for 15 years for irrigation projects and 7 years for roads by running financial rather than economic rates of return.

The flow of benefits attributable to irrigation projects is assessed incrementally. The incremental gains are valued by multiplying output with constant farmgate prices for individual crops. In order to guard against overestimation, prices and yields are below the seasonal average. Benefits are computed on a “per hectare” basis as opposed to a “typical farm” basis.

Benefits from drainage, flood control as well as rehabilitated canals trickle in small amounts as farmers progressively bring new land into cultivation after the rehabilitation of the irrigation systems. In most cases it takes up to five years to bring all the additional land into full development. This leads to a lower cash flow in the first few years, which eventually becomes larger when projects reach “full development” year (that is when all the land is brought into full use). Most projects reach this full development in year 6. RAMP is thus claiming benefit for a maximum of 8 years for some irrigation projects (5 years as new land is brought into cultivation and for the first 3 years after full development). In a situation where no new land is brought into cultivation after the rehabilitation work, benefits are claimed for the first three years only.

Irrigation project benefits were to result from three sources: increases in yields, increase in cropped area, area shift and cropping intensity involving high-value vegetables. Yields are assumed to be constant overtime, but area shift and crop intensification is predicted to take place once the land is brought into full use. Thus, it is predicted that a 5% area shift from inferior crops (proxied by maize) to high-value crops (proxied by melon) will occur every five years starting in year 6. Crop intensification involving the cultivation of more high-value vegetables, like onions, tomatoes, okra, chilies, etc is predicted to occur at the rate of 3% every three years, starting from year 6 on wards for most locations. This rate goes up to 5% in the latter years of the project life.

Both area shift and crop intensification are geographic specific and a function of many factors such as population pressure, agriculture commercialization, and market development. Area shift is expected to occur in the land expansive provinces in the North – Kunduz, Balkh and to some extent in Baghlan. Here, water rather than land is a binding constraint. With irrigation rehabilitation and improved supply of adequate and reliable water, it is possible for farmers to reduce the area cropped with cereals and allocate more land to high-value crops.

Crop intensification rather than area expansion is predicted to occur in Parwan, Nangarhar and Helmand Provinces, because the first two provinces have a high population density which translates into small land holding per family. Under subsistence agriculture such farmers are not expected to forego the cultivation of traditional cereals for food security reasons. These two provinces are also known for the production of vegetables for the big

markets in the country. Intensification in Helmand is predicted, because the demand for vegetables in the Southern provinces, including in Kandahar, is mostly met by imports from Pakistan. This domestic demand (hence higher prices paid by consumers) can be an inducement to farmers to grow more seasonal vegetables for the local market. Area shift in Helmand is also unrealistic, because of the production of illicit crops where the average return per unit land from poppy is substantially higher than from most crops.

Regarding roads, impact is measured for all the 20 roads completed by the end of June 2005. Five of these roads, all located in Baghlan and Kunduz, were completed in September 2004. The remaining fifteen roads were completed in 2005, some a couple of months before the survey. The economic benefits resulting from the rehabilitation of the roads were predicted, both for completed and ongoing roads, by measuring: a) vehicle operating cost savings and the benefits that are passed on to farmers (assuming a competitive transport sector); b) increased agriculture production; c) reduction in spoilage loss; d) producer transport cost savings (freight cost); e) passenger road user savings (fares); and f) travel time cost savings (opportunity cost). These benefits were aggregated for each road and like the irrigation projects financial analysis were performed to determine their viability. In each case the analysis was performed for seven years. The roads are expected to function for seven years. These benefits can rightly be attributed to RAMP. However, in order to guard against over estimation, a more conservative approach has been adopted in which benefits are claimed for the first three years. By year four some maintenance cost would be required.

Elasticities from other developing countries suggest that improving access to markets induces a 3% growth in agriculture productivity. It is assumed, rather conservatively, that the RAMP roads will induce an annual increase in agriculture productivity of 1.5% per annum for year two and three and a further 2% from year 4 to year 7. Year one impact is determined by the survey data. These growth rates were applied to all the roads, except to Alef Berdi road located in Imamsahib district, Kunduz province. This road connects a large number of isolated villages and given a timely and appropriate maintenance the road will induce more intensification of production. The annual growth rate for Alef Berdi road is thus assumed to be 2% for the year two and three and 3% for year for to seven. The indirect impact of the roads, especially those completed lately has been minimal at this stage. Experience from other countries suggests that the direct impacts of rural roads are realized with a lag of at least two to three years after their completion.

II. Agriculture Production and Marketing:

Benefits from the crop sector are measured from production and marketing related activities promoted by RAMP. These benefits are derived by valuing incremental gains and value added benefits from sub-sector activities and are calculated on an annual basis for three years.

- Benefits from the dissemination of best practices to increase crop productivity;
- Marketing of fruits and nuts and valuation of marginal price increments;
- Eradication of diseases like sunn pest and locust and valuation of potential savings made, taking wheat as a proxy;
- Value added benefit from vegetable production and processing; and
- Incremental productivity gains from the distribution of improved inputs that aimed at increasing wheat production.

Benefits from these activities are calculated on an annual basis for three years.

Impact from the livestock and veterinary interventions were calculated from coverage data reported by the IPs. The calculation is done on an annual basis for a total of three years and assumes that post-vaccination benefits can be predicted now. As a first approximation, coefficients on herd structure, mortality and productivity are computed for cattle, small-stock, equines and camels. Head losses were estimated as a function of the value of the animal.

Assuming that price reflects the expected future income from an animal, the cost of mortality is calculated by applying the price of an animal. Losses are estimated by classifying animals by age/sex and applying percentage mortality in each category. The net gain is therefore a weighted average of different age/sex class of animals.

Productivity gains from cattle, sheep and goats (milk, meat, hides and skins, wool, hair) and poultry are also estimated and valued. Traction and transport are the two most important values of work animals. Oxen, the group of equines and in some cases camels are the most important species used for transport and work. Productivity gains from equines and camels are measured for their work and transport and in the case of camels for meat as well.

III. Rural Finance:

The methodology to measure impact of rural finance is largely a projection as most of the projects are in the early stage of development (except for the micro-credit component). There are three components to the rural finance rogramme: micro-finance, SMEs, and venture capital fund. For each of these components, three scenarios were simulated: pessimistic, optimistic and conservative. RAMP is claiming impact for conservative scenarios.

The micro-finance impact through MISFA is analyzed on historical repayment rate (99%) and the assumption that a portion of the loan (5%) is used for income smoothing rather than adding value to the business. The value added is based on the weighted-average effective interest rate of 35% charged by RAMP-funded Micro Finance Institutions (MFIs).

The SME loans through the Afghanistan Finance Company (AFC) and the Afghanistan International Bank (AIB) are premised on the basis that adequate time will have to lapse before investments begin to generate benefits. As of today not all the loans disbursed. With little historical data to analyse, it is assumed that the repayment rate for SMEs will be lower than that for micro-finance.

With an initial capitalization target of US$20M potentially growing to US$30M, venture capital funds were predicted to be generating substantial revenue. However, to date the ARF has not started operations in Afghanistan – it has targeted February 2006 a starting date. Given the total lack of historical data, projections are made using a 42% IRR target set out by the ARF over 5 years.